Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

1.9
F7626T
no. 14

Forest Service Library

CALIFORNIA FOREST AND RANGE
EXPERIMENT STATION

FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE
IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA
BERKELEY

Technical Note No. 14 January 22, 1941

A PRELIMINARY SURVEY OF UTILIZATION CONDITIONS FOR SECOND-GROWTH TIMBER PRODUCTS FROM THE WESTERN SIERRA NEVADA

By René Bollaert, Junior Forester, Division of Forest Economics

Second-growth and residual timber will, through the years, become a larger and larger proportion of the total timber resource of California as virgin timber is logged and young growth takes its place. Today about 1.5 million acres of second-growth and residual forests are found on the western slope of the Sierra Nevada. The reproduction that established itself after logging operations of the early mining days has grown rapidly and during the past several decades has been used not only for mine timbers but also in more recent years for commercial sawtimber.

With increasing utilization of second-growth ponderosa pine and other species, mainly by the small sawmill operator, there is a growing need for information on products, prices, competitive factors, outlets and market relationships concerning this second-growth timber. Without such information wood utilization in this region will continue in a haphazard fashion to the detriment of both the resource and the operator. Therefore, in order to obtain data to serve as background for more intensive research, for an historical statement of a changing situation, for the information of county farm advisors and others interested in farm forestry, and for those generally concerned with forest management in the second-growth areas, a survey was made in the summer of 1940 by interviewing about 75 operators of sawmills (mainly small ones), mines, mine pole operations, box factories, veneer plants, and other producing units.

Second-Growth Timber

The second-growth under consideration lies in a belt along the lower reaches of the western slope of the Sierra Nevada from about the middle of Fresno County north into the middle of Shasta County. This area, which is bordered on the west by the San Joaquin and Sacramento Valleys, extends about 400 miles in length, and is 10 to 30 miles wide. The timber belt, which consists principally of ponderosa and sugar pines, Douglas-fir, and California incense-cedar, is widest in Nevada, Placer, and El Dorado Counties where timber resources were heavily drawn upon in the early days to supply mines, mining towns, and adjacent foothill and valley agricultural areas. The greatest part of this second-growth timber has come in on old logging operations and abandoned fields so now, after 60 to 80 years, there is a mottled pattern of second-growth, residual, and virgin timber intermingled with brush, range, and agricultural lands.

The second-growth timber that came in on areas virtually cleared by the earliest logging operations is generally in fairly uniform stands of straight even-aged trees. Diameters run from 12 to 36 inches for ponderosa pine and a few inches larger for sugar pine. Douglas-fir and California incense-cedar are usually smaller in diameter. Because of the rapid growth on heavily logged areas of high timber-site quality, trees occasionally have internodes up to 40 inches in length and annual rings of half-inch width. They usually contain very little if any clear lumber because branches persist on the trees nearly to the ground.

The earlier cuts in some of the original virgin tracts were selective operations for the largest and best trees. The degree of cutting varied from selection of an occasional straight-grained sugar pine for shakes to removal of everything in the stand except a residuum of scattered young and defective trees. In some areas, old-growth timber was apparently selectively logged only once and this resulted in a fairly even-aged young age class. In others, a series of cuts separated by one or two decades has progressively removed the volumes of old-growth timber to various degrees and provided for entry of second-growth timber in several age classes. The residual stands occupying the young-growth timber belt are therefore variable in composition and age.

Lumber Production

Character of the Industry

The utilization of second-growth timber accompanying the mining boom of the 1930's is almost a repetition of the utilization of the original timber in the early mining days. Small mills increased rapidly in the second-growth belt in response to the brisk demand for rough lumber that accompanied the influx of gold miners since about 1930. Second-growth lumber was readily accepted for the rough structures built by these miners, largely because of its local availability and low cost. In addition box shook at first found a ready market. However, during the last few years a number of factors, such as levelling off of the mining boom with corresponding decreased demand, objections to box shook made from second-growth timber, seasoning difficulties, and unreliability of some small sawmills, have contributed not only to a general decrease in lumber output from the second-growth belt in general, but to a decrease in the use of second-growth timber in particular. This explains in large part the excess capacity, intermittent operation, and poor financial condition of many small mill operations. By buying out some operators who were about to fail, newcomers extended the life of these operations and thus prevented what might have become almost a collapse of the small sawmill industry in the west slope of the Sierra Nevada. The period of decline of small mill operation has therefore been marked by a high incidence of transfer of ownership as well as idleness, abandonment, and dismantling of mills. Because it is cheaper to move these small mills to new timber than to haul logs long distances to the mill, there has also been considerable moving from place to place as stands around the mills became cut out.

The net result of these trends is a reduction in the number of small operators, a shift in location of mills to areas where sufficient old-growth timber is available to sustain the operations, and a tendency toward utilization of greater proportions of old-growth timber at mills operating in residual stands.

In 1939 about 30 to 35 sawmills were cutting some second-growth timber along the west slope of the Sierra Nevada but mainly in the central section of the belt. These mills cut an estimated total of about 8 million board feet of lumber from second-growth timber. Of this, approximately 800,000 to 1,000,000 board feet were cut by the five to seven mills sawing second-growth timber exclusively. The remainder was sawn in various proportions with old-growth timber by the 25 to 30 other sawmills that included second-growth timber as part of their cut. Mills operating in stands of the second-growth region are generally rather small. Their capacities range from about two to fifty-five thousand board feet per day, but the majority produce from three to ten thousand board feet per day. Because inclement weather makes operation impractical during winter months, because demand is active only in the summer months and cutting is geared rather

closely to demand, and because of a number of other factors that interrupt operations, 1939 production of lumber was as low as 15 thousand board feet in some of the smaller mills. Larger mills operating in stands of the second-growth belt cut several million board feet per year. The average operation produced perhaps 300 thousand board feet in 1939. The larger the capacity of the mill, the more likely it is to utilize exclusively the old-growth timber in residual stands, or to operate entirely in virgin timber.

Since light equipment is adequate to handle the smaller logs usually found in the second-growth region, portable or semiportable equipment was generally used. Partly because of lightness, poor condition, and perhaps in some cases because of lack of skill of the operator, the product issuing from these small mills was to some extent poorly manufactured. Dimensions of lumber produced at some mills varied in amounts far in excess of reasonable tolerances from board to board and from end to end of a given board.

Markets

Even within a given section of the second-growth region there is considerable variation in condition of lumber market, type of timber cut, and products produced by individual mills. Differences in market requirements from place to place, in roads, in distances to outlets, in the timber available, and many other factors, including the abilities of the operator, have a bearing on the characteristics and volume of lumber that each mill can sell.

Many small mills are, by reason of capacity and low-quality ungraded products, restricted principally to local markets within the second-growth region and nearby urban centers. The limited capacity of these mills and the general practice of disposing of their lumber as soon as possible prevent their accumulating sufficient stock to permit grading or seasoning the lumber. This in turn contributes toward restricting their markets, since retail lumber yards generally prefer to buy rather large quantities of well-manufactured lumber by species and grades.

The four principal market outlets for second-growth lumber are local farmers and other residents, local mines, valley farmers, and box factories.

Local farmers and other residents use lumber for cabins, summer homes, permanent residences, stores, lunch and drink stands, taverns, amusement halls, shacks, garages, barns, fences, and corrals. Most of the lumber consumed locally is for rough construction, chiefly for framing, sheathing, and subflooring on better buildings, and for the whole structure when temporary or rough construction is satisfactory. Small amounts of knotty pine lumber, milled log siding, and other surfaced materials are also produced and sold locally. Sales are usually small separate orders, the buyer frequently doing his own hauling. Prices are usually quoted at the mill for mill-run lumber.

Mines utilize principally Douglas-fir, in larger dimensions than lumber for general construction. Lumber and timbers are generally delivered to the mine by the operators on the basis of mill price plus hauling cost.

Farmers from the central valley come in search of cheap lumber for barns, sheds, fences, and other rough construction. They usually buy mill run at mill price and haul the lumber themselves.

Box factories are generally located in the valley cities, the greatest concentration of capacity being in Sacramento and Stockton. Box lumber is usually a considerable part of the total output of the small mills which cut it in the second-growth region. Box lumber is usually cut on contract for a stipulated delivered price, which, being fairly low, cannot be successfully met without resorting to quantity production.

Competition

Generally speaking, three-way competition exists in the lumber market of the second-growth belt. This region is not only the principal market area for second-growth lumber but it is also a common meeting ground for Douglas-fir from the Northwest, and California old-growth pine lumber.

Douglas-fir from Oregon and Washington has advantages as a wood for ordinary construction in that it is a strong, straight, fairly high-grade wood, and obtainable in long dimensions with a high proportion of heart. Architects and contractors are familiar with its character, and because of its cheapness, dependability, and availability, tend to specify or use it without fully considering other woods. Mines prefer it because its strength is considered greater than locally grown old-growth Douglas-fir timber, and it has little or none of the sapwood common in locally grown second-growth Douglas-fir. In heavy construction such as large buildings, bridges, and mine head frames, where large dimensions in long lengths are required, Douglas-fir from the Northwest has no satisfactory local competitor.

The delivered price of this Douglas-fir is also an important factor in its ability to successfully compete with lumber grown and sawn in California. In many instances this fir lumber is delivered at local retail lumber yards for about the same price or for less than California lumber.

In addition to competition from Pacific Northwest lumber in local markets, small second-growth mills face rather stiff competition from larger mills cutting old-growth timber in the region. These two groups of mills clash in the same market areas and with similar products. For example, second-growth sugar pine and ponderosa pine lumber are in rather strong competition with old-growth lumber at box factories. There the old growth is preferred, however, because it has finer, softer grain and less tendency to split when being nailed. Furthermore, the larger old-growth mills are often more dependable sources of supply in that they continue in business from year to year and are more likely to fulfill their contracts. Smaller mills sometimes default on their contracts when production is interrupted or terminated by breakdowns of equipment, sickness or accident of the operator, or other complications arising out of their poorer equipment, inadequate financing, and limited manpower.

Small mills have an advantage over large mills since by disposing of their entire outputs directly to consumers within a radius of a few miles of the mill the cost of long hauls is avoided and consumer price becomes mill price plus a moderate hauling charge. The lumber produced by larger mills, which depend upon wholesale outlets to dispose of their greater output is normally sold to consumers at higher prices than the locally retailed product of small mills because of the extra handling costs and dealer margins.

Prices and Costs

Generally speaking, the price for general construction and mining lumber runs from $15 to $22 per thousand board feet at the mill. Greater variation in price is usually found from operation to operation within one section of the second-growth region than from section to section of the region. This is perhaps due to a considerable extent to differences in the operator's marketing ability and valuation of his own time. Most commonly, the price was from $18 to $20 per thousand board feet at the mill.

Box lumber has perhaps the lowest mill value of all commodities sawn by mills in the second-growth region. The cost of hauling, which varies from about $2.50 to $5 per thousand board feet, depending largely on distance from mill to factory, is borne by the mill operator. A delivered price of $18 therefore becomes $13 to $15.50 per thousand board feet at the mill. A further reduction is frequently made in order to compensate for variability in thickness by scaling the 6/4 plank as 5/4, thus reducing by 1/6 the mill operator's output of box lumber, and correspondingly diminishing net mill price.

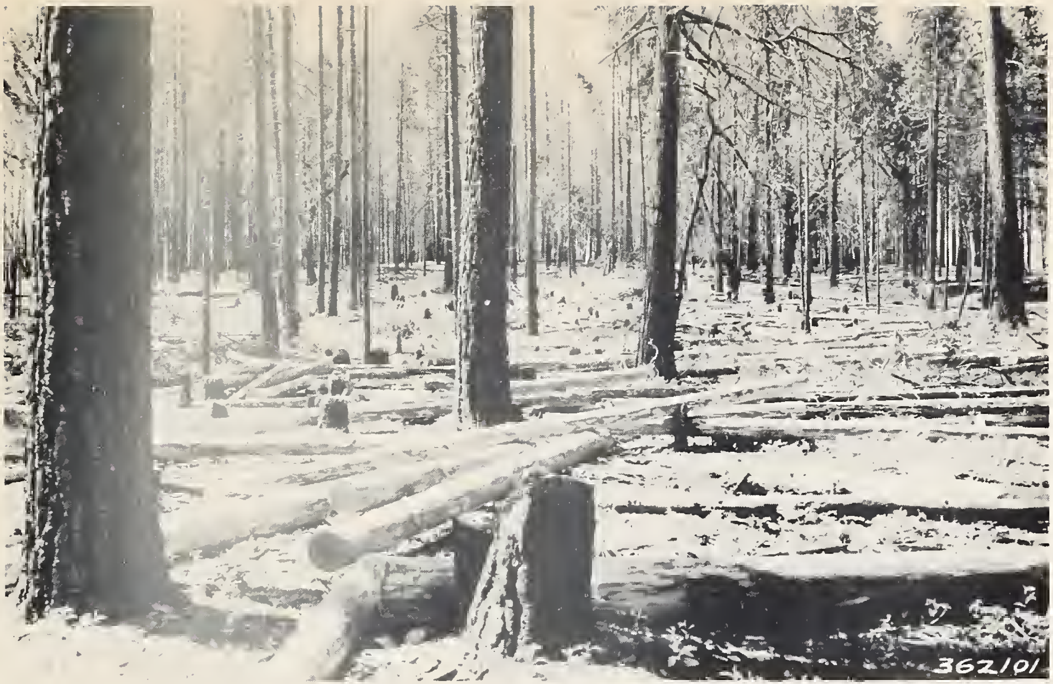
Prices for second-growth stumpage run from about 50 cents to $3 per thousand board feet. Very low prices for stumpage are usually associated with some form of clearing operation. Prices for stumpage are generally a little higher in the middle of the second-growth belt than in the northern and southern extremes. In 1940 the average price for all species and areas was about $1.75 per thousand board feet, but the modal price was about $2 per thousand board feet on the stump. In the log, timber was usually valued at $7.50 to $10 per thousand board feet at the mill. Local availability seems to be a greater factor in the price of logs or stumpage than quality or species. Thus, where Douglas-fir is scarce locally, it generally commands a higher price than pine. Where it is plentiful, it is generally cheaper than pine. Not infrequently stumpage is sold on a straight forest-run basis regardless of species. Purchase of old-growth and second-growth timber in residual stands is also frequently on a forest-run basis where the operator takes both types.

Mine Poles

In former days when local timber was used exclusively, supplying the mines with mine poles was a substantial industry. Many local residents having access to timber and hauling facilities hauled great quantities of local Douglas-fir mine poles to the mines by means of teams and wagons. At that time high prices prevailed. With the development of good roads and trucking equipment, it has become possible to import sawn timbers from the Northwest and force the local product out of all but the more remote mines and the temporary stopes and backfill workings of mines that are near good roads. Since imported sawn Douglas-fir is an excellent commodity for mining timbers because of its strength and durability, its convenience and economy of space in mine shafts, and its uniform size, locally produced round timbers can compete only on a lower price basis, and then only for uses in which less is expected of them.

The result has been a gradual decline in the use of local round timbers and a marked reduction in the mine pole industry in the Sierra foothills. Although some market remains it is dependent on uncertain mining activity and most of the relatively few operators today conduct their business as a side line to other means of income such as farming or general hauling, and are for the most part losing interest in it because of the declining market, falling prices, and a growing scarcity of suitable timber.

About 1.2 to 1.5 million lineal feet of mine poles were removed from second-growth stands by 17 to 20 operators in the region in 1939. Except for scattered operations, there are two principal concentrations of the industry. One is in the Jackson-Plymouth region in Amador County, and the other is in the Nevada City-Grass Valley region of Nevada County. The latter produces about seven times as many lineal feet of poles per year as the former.



F362101

Figure 1. A mine pole salvage operation in a fire-killed 70-year-old stand of second-growth ponderosa pine in Eldorado County. Because this is salvage work, the cutting is heavier than is customary in this type of operation.

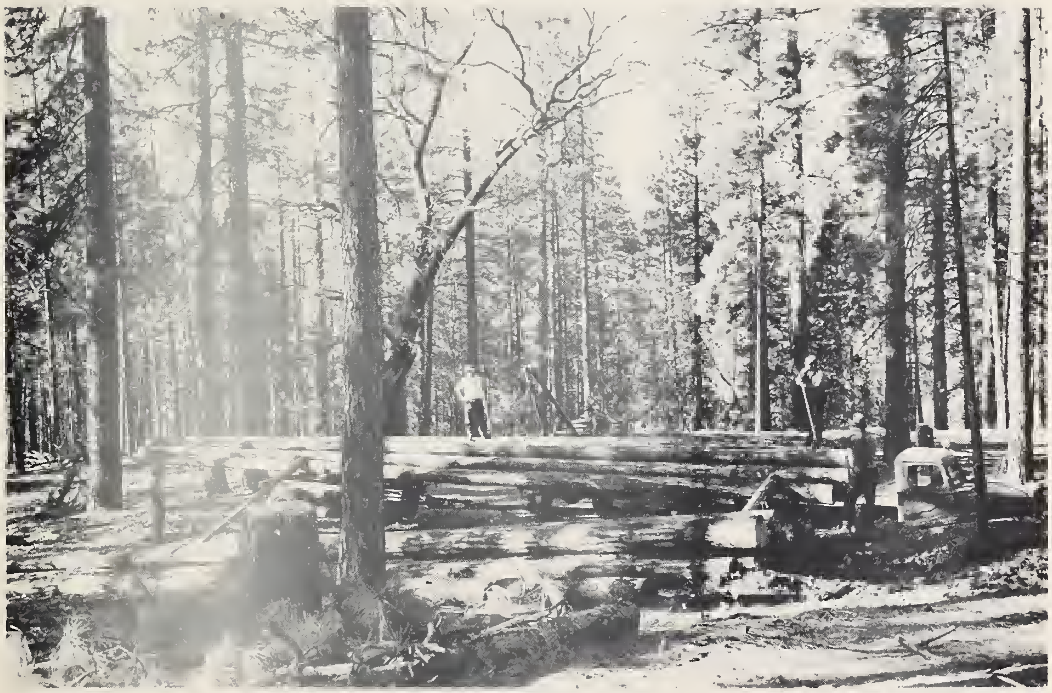


Figure 2. Second growth ponderosa pine piling being loaded for trucking to the San Francisco Bay region. This operation was east of Oroville in Butte County.

Utilization of ponderosa pine and Douglas-fir varies through the region. South of Jackson, ponderosa pine is fairly well accepted because Douglas-fir is scarce. Trees must be felled in the fall and winter; and the pieces must be ax peeled and seasoned until the following summer. In the Grass Valley-Nevada City area, fairly large amounts of ponderosa pine are accepted despite the availability of Douglas-fir. Also in this area, there is not the strict insistence upon fall and winter felling, ax peeling, and thorough seasoning as in sections farther south.

The general practice of mines in one area has been to allocate requirements among their usual suppliers at a stipulated scale of prices. As a result, price competition between suppliers of mine poles has not been so important in limiting the number of pole operators and the quantity of poles supplied by each as their willingness to supply quantities asked for at the prices offered in this region. In another area, mines have shifted to a system of issuing invitations to bid for their annual requirements. This policy set suppliers of mine poles in stiff competition with one another, and led to a sharp drop in prices and number of operators.

Mine poles are measured and sold in a variety of ways. The commonest practice at the mines is to buy them by the piece in 16-foot lengths at prices established for different top diameter groups ranging from 6 to 19 inches. Other methods of payment are per lineal foot in various or specified lengths and diameters, and per diameter inch for standard lengths. Cutters, dealers, and timber owners usually calculate costs and prices by the lineal foot.

In one producing area the smallest diameter mine poles bring about 40 cents at the mine, and the largest about $2.25. In another, the smallest poles bring 75 cents each, and the largest bring up to $4.50 and $5 each. Stumpage varies from 8 to 40 cents for 16-foot mine poles, depending upon diameter of the piece and location of the operation. Felling and peeling costs range from 12 to 40 cents per pole, depending somewhat upon diameter of the piece, but largely on whether it is ax peeled or spudded. Skidding to roadside costs from 2 to 8 cents per piece, and the cost of hauling runs upwards from about 15 cents per piece for short distances.

Posts and Poles

Split cedar fence posts cannot be made satisfactorily from second-growth timber because knots are a source of difficulty in splitting. Large quantities of posts are made annually from old-growth cedar, however. Some are split from cull cedar trees left on logging operations, and others from trees selected at random in the woods.

A few widely separated operators produced a total of about 65,000 lineal feet of poles, most of which were of ponderosa pine, California incense-cedar, or sequoia. Stumpage ran from $\frac{1}{2}$ to 2 cents per lineal foot, and the product sold for $7\frac{1}{2}$ to 10 cents per lineal foot delivered.

Fuel Wood

Fuel wood was the basis for a rather extensive and profitable industry in the Sierra foothills some years ago. With the widespread extension of natural gas distribution lines throughout the Sacramento and San Joaquin valleys and the rapid increase in use of fuel oil both in valley and foothills, the market for fuel wood for heating of homes has slumped greatly in recent years. Gas and oil are almost everywhere as cheap as and more convenient than wood for heating. The market for wood for cooking has also fallen, but not as much in the foothills as in the valley agricultural areas. In the valleys piped gas has almost wiped out the market for fuel wood for cooking, and in the foothills and mountains electricity and tanked gas have made serious inroads. Kerosene has, of course, had its influence in all areas since the introduction of modern, attractive, and efficient kerosene cooking stoves and heaters.

With the continuing trend in the use of fuels other than wood, the future of the fuel-wood market is not encouraging, although a considerable volume of fuel wood will continue to be used, since oil and gas will not be used in every home, and in many in which petroleum fuels are relied upon for general heating, logs will be used in fireplaces. Even here, however, fireplace logs manufactured from mill waste appear to be tapping a substantial part of the demand.

The fuel wood industry is composed of numerous individual operators and is widespread and heterogeneous. Fuel wood operations vary in size from those producing over 100 cords per year and established on a commercial basis to those producing only a few cords per year for the operator's own use. This range includes almost every property owner who has large or small amounts of trees or brush on his land. The production of fuel wood is rather variable from year to year principally in response to winter temperatures. Fuel wood produced as a byproduct from slabs and edgings at sawmills, and mill waste from other wood utilization plants also make up a significant part of the total fuel wood consumed.

Oak generally ranks as the preferred wood for fuel and in volume of cut probably exceeds that of pine and manzanita, with which it competes. Except for slabs and edgings, second-growth timber is not generally used for fuel. In 1939-40 oak, sawn to 14 inches for local consumption and to 12 inches for valley consumption, sold for $10 to $12 per cord delivered locally and $12 to $14 per cord delivered in Sacramento, where the price rose to $16 per cord in winter. Digger pine, split and sawn to 4-foot lengths, brought $6 to $10 per cord delivered at Sacramento, the price rising to $12 per cord in winter. Prices for softwood slabs and edgings cut to stove lengths varied from $2.50 to $8 per cord at the mill in 1939. This fuel wood is usually sold by the tier (of which there may be either three or four per cord) to local residents who themselves haul it away. Fuel blocks coming as waste from box shook and pencil slat plants brought from 1 to 4 cents per cubic foot at the plant, stacked by the purchaser. Stumpage was usually obtained from the operator's land, although some of it was obtained free merely for clearing it off the land of others.

Piling

Piling was cut rather extensively in parts of the foothill area in 1940. Up until a few years ago Douglas-fir from the Northwest was preferred for piling over the same species grown in California. In recent years, however, purchasers have begun to use local second-growth Douglas-fir, which has come mainly from Sonoma and Mendocino Counties. The expansion of operations into the Sierra foothill area is quite new but appears to be taking hold rapidly. Many 1940 cuttings were of Douglas-fir but in the foothills much second-growth ponderosa pine and some white fir also was cut. In fact by the end of 1940, pine was making up a considerable part of the total take for piling in this second-growth region. Ponderosa pine withstands driving well enough for it to be accepted for temporary emplacements and for jobs where piles are to be entirely submerged in soil below the water line. For these purposes ponderosa pine and Douglas-fir are used without distinction and retail for practically the same price of 21 to 22 cents per lineal foot delivered in the San Francisco Bay area. The stumpage price is from 3/4 to $1\frac{1}{2}$ cents per lineal foot. Most of the piles are from 65 to 70 feet long and the minimum top diameter is usually about 6 inches.

Although perhaps temporary in nature, accelerated waterfront construction as a result of the national defense program tends to make the piling market one of the brightest for second-growth timber during the next few years, according to present indications.

Veneer

A limited amount of veneer is manufactured from second-growth ponderosa pine using bolts from 18 to 26 inches long. Trees are selected that have internodes of acceptable length, and the bolts are cut from between the nodes or whorls of branches in order to obtain clear wood. Cores are sometimes sold for fuel and sometimes sawn into box cleats. The principal use of veneer is for slats and tops for boxes. A considerable amount of veneer may also be used in the manufacture of veneer baskets when they become widely accepted. One of the difficulties in production of the latter item is the cost of hardwood hoops, which now must be imported from the East at slightly more than half the cost of the finished basket. Competition is not especially severe, perhaps because of the small number of producing plants. In the long run, the market for veneer, which is now small but fairly steady, seems to hold reasonable promise for gradual improvement.

Conclusion

This preliminary survey has reviewed utilization conditions for second-growth timber products in the foothill region of the western Sierra Nevada as they were found in the summer of 1940. Utilization conditions and prospects are, of course, subject to change, and no survey can be definitive.

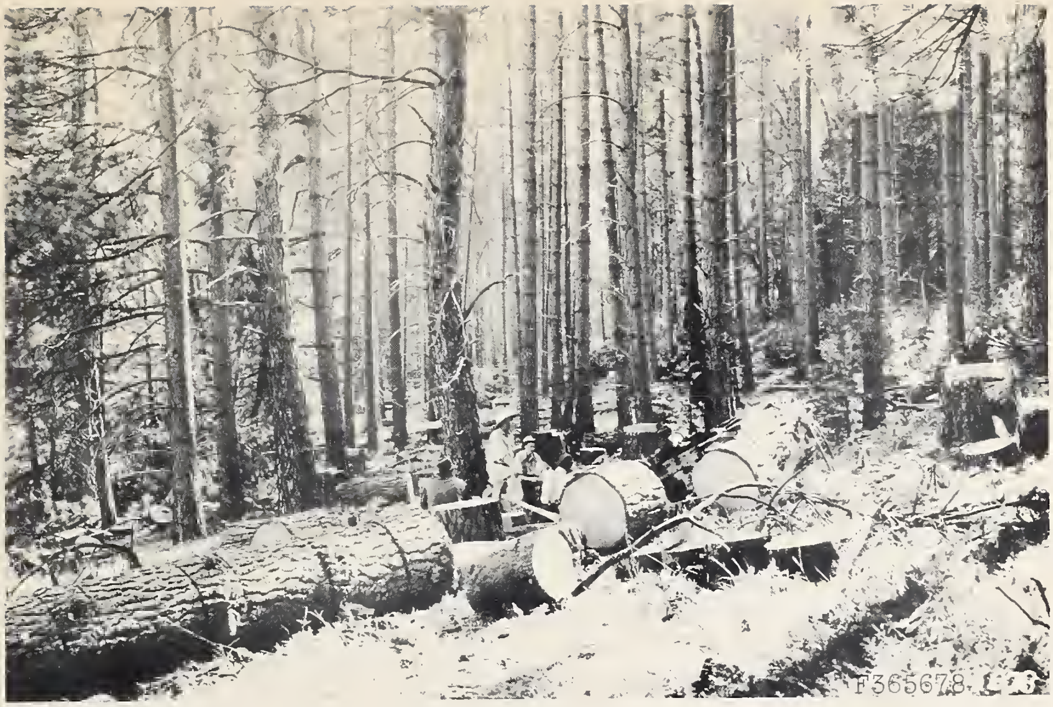
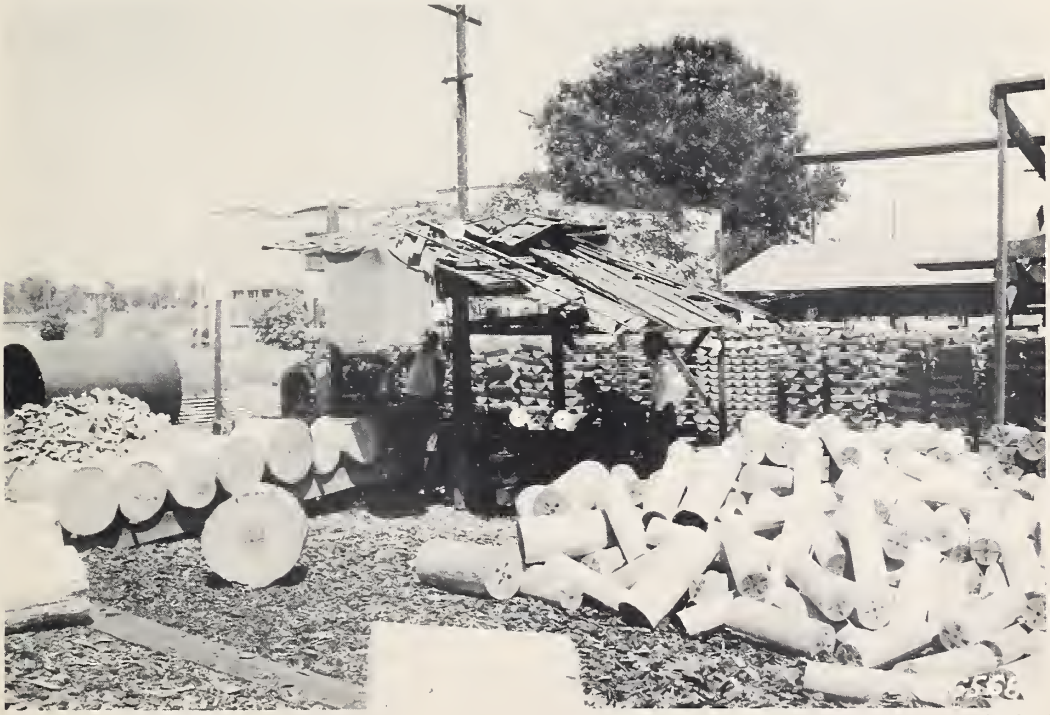


Figure 3.- Veneer bolts being cut from second-growth ponderosa pine in the western Sierra foothill region. Bolts 18 to 26 inches long are sawn from the clear wood between branches.



F365686

Figure 4.- Rotary veneer being cut from second-growth ponderosa pine bolts at a small box top factory. Veneer cores are sawn into cleats.

The trend in the use of second-growth lumber has been downward during the past few years and the prospect of developing a satisfactory outlet for second-growth lumber manufactured by small sawmills does not appear favorable. There are many handicaps such as poorly equipped mills, levelling off of the mining boom with corresponding decreased demand, seasoning difficulties, hardness of the lumber, and its alleged tendency to split when used for box shook. There have also been recent declines in the demand for mine poles and fuel wood from the second-growth region.

Two secondary wood products, namely piling and veneer, show increasing production. The manufacture of box top veneer from second-growth timber has been slowly but steadily increasing since its beginning several years ago, and may be expected to continue increasing gradually if the use of veneer baskets gains wider acceptance. Production of piling from second-growth in California, especially from ponderosa pine, is a recent and somewhat spectacular development that has attracted considerable attention. Stimulus for the demand comes mainly from national-defense construction projects in the San Francisco Bay area and consequently the piling market may decline somewhat after the construction peak is passed.

If present indications are borne out, operators of farm and small industrial forests can expect to find adequate lumber markets only by ignoring much of the second-growth for the time being and drawing mainly on old-growth timber. This is perhaps a desirable development because the second-growth, although now becoming merchantable, is not yet mature or ripe for harvesting. If properly selected, some products such as mine poles, fuel wood, and possibly veneer trees, may be taken from certain second-growth stands without detriment to the future volume or quality of sawtimber. Piling probably will continue to be taken as long as there is a demand even though trees suited to this purpose would make good lumber if left to mature.